## Space Weather Forecast

Issued on Thursday, 29 September 2022 at 01:10 Local

**This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales**

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**Space Weather Forecast Headline: G1-G2/Minor-Moderate geomagnetic storms likely to develop from late day 2 (30th) or day 3 (1st). Chance of G3/Strong from CME arrival on day 3 (1st).**

**Analysis of Space Weather Activity over past 24 hours**

**Solar Activity:** Solar activity has been Low with several common class flares observed, although the frequency of these has been declining. There are four sunspot regions on the Earth-facing disc, however these are generally simple and either stable or showing since of decay. The only small growth of any spot observed was near the larger northern hemisphere spot near centre disc, although this remains simple. A CME (coronal mass ejection) was observed leaving the Sun early on the 28th due to the eruption of a filament (or line of plasma) near the centre disc sunspot. This has been assessed as having a potential Earth-directed component.

**Solar Wind / Geomagnetic Activity:** The solar wind has shown easing CME influence, along with recent coronal sourced fast winds easing. This has resulted in the elevated winds of 550-600 km/s easing to around 470km/s. The magnetic field remained weak, and with its north-south component also weak and pointing in a positive direction. The resultant geomagnetic activity was Quiet (Kp0-1)

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) was at or near normal background levels, and well below the level of a solar radiation storm.

**Four-Day Space Weather Forecast Summary**

**Solar Activity:** Solar activity is forecast to be generally Low, with a chance of isolated Moderate-class flares.

**Solar Wind / Geomagnetic Activity:** The CME from the filament eruption on 28/0400 UTC has the potential to move across Earth on day 3 (1st). Solar winds are expected to be easing day 1 (29th), before the next coronal hole sourced fast wind arrival later day 2 and during day 3 (30th and 1st). These fast winds persisting day 4 (2nd). Quiet geomagnetic activity with Unsettled intervals possible at first, likely increasing to G1/Minor to G2/Moderate storm with the arrival of the fast wind. This may then increase further day 3 (1st) from any CME arrival, with a chance of G3/Strong Storm. Activity easing to Quiet to Active day 4 (2nd), but still a chance of further G1/Minor Storms,

**Energetic Particles / Solar Radiation:** The count rate of energetic particles (high energy protons) is likely to persist close to background levels with no solar radiation storms occurring.

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Met Office

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**Geomagnetic Storms:**

| Geo-Magnetic Storm Probability (Exceedance) | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Minor or Moderate | G1 to G2 | No | 5 | 70 | 70 | 30 |
| Strong | G3 | No | 1 | 10 | 30 | 1 |
| Severe | G4 | No | 1 | 1 | 5 | 1 |
| Extreme | G5 | No | 1 | 1 | 1 | 1 |

**Radio Blackouts - X Ray Flares:**

| X Ray Flares Probability | Level | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | R1-R2 M Class | No | 20 | 25 | 30 | 30 |
| Very Active | R3 to R5 X | No | 1 | 1 | 1 | 1 |

**Solar Radiation Storms - (High Energy Protons):**

| Radiation Storms Probability (Exceedance) | Level ($cm^{-2}$ $sr^{-1}$ $s^{-1}$) | Past 24 Hours (Yes/No) | Day 1 (00-24 UTC) (%) | Day 2 (00-24 UTC) (%) | Day 3 (00-24 UTC) (%) | Day 4 (00-24 UTC) (%) |
|---|---|---|---|---|---|---|
| Active | ≥ S1 | No | 2 | 2 | 2 | 2 |
| Very Active | ≥ S3 * | No | 1 | 1 | 1 | 1 |

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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